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HONOLULU
LA JOLLA
MONTEREY
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SOUTHWEST FISHERIES CENTER

MONTHLY REPORT - MARCH 1980

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SOUTHWEST FISHERIES CENTER
LA JOLLA, CALIFORNIA

HONOLULU LABORATORY
LA JOLLA LABORATORY
TIBURON LABORATORY
PACIFIC ENVIRONMENTAL GROUP

MONTHLY REPORT - MARCH 1980

STATUS OF PUBLICATIONS

Published

Arthur, David K. 1980. Differences in heart size between ocean-caught and laboratory-grown larvae of the northern anchovy, Engraulis mordax Girard. J. Exp. Mar. Biol. Ecol. 43:99-106.

Large differences in heart size occur between ocean-caught and laboratory-grown larvae of the northern anchovy, Engraulis mordax Girard. At 4 mm in standard length (3 days), laboratory-grown larvae had hearts only slightly larger than ocean-caught larvae, but at 9 mm (16 days), hearts of laboratory-grown larvae were 40% longer. Thereafter, the percentage decreased to 24% at 19 mm, the longest laboratory-grown larvae available. The percentage probably decreases further in larvae longer than 19 mm as indicated by trends in the allometric growth equations. At the first-feeding stage in the laboratory, larvae that had been feeding for 2 days had larger hearts and deeper bodies than non-feeding larvae.

Eber, L.E. and Roger P. Hewitt. 1979. Conversion algorithms for the CalCOFI station grid. CalCOFI Rep. 20:135-137.

This note presents algorithms which may be used to convert station positions expressed in geographic coordinates (latitude and longitude) to the California Cooperative Oceanic Fisheries Investigations (CalCOFI) station grid coordinates and vice versa. Clarke's spheroid of 1866 is used as an estimate of the geoid off the west coast of North America.

THIS REPORT DOES NOT CONSTITUTE PUBLICATION AND IS FOR INFORMATION ONLY.

Hewitt, Roger P. and Paul Smith. 1979. Seasonal distributions of epipelagic fish schools and fish biomass over portions of the California Current region. CalCOFI Rep. 20:102-110.

Coarse distribution patterns of epipelagic fish schools over portions of the CALCOFI survey patterns are contrasted with estimates of biomass distributon patterns by season. Frequency distributions of fish-school sizes and peak target strengths are presented as well as the seasonal dependence in the position of these distributions. The data were collected on a series of six CalCOFI cruises during late 1974 and 1975.

Stevenson, Merritt, Charles Booth, James Squire, Jr., and Yoshimine Ikeda. 1979. Use of airborne radiometers for monitoring sea surface temperature and chlorophyll in a coastal fishing zone. CalCOFI Rep. 20:138-142.

The need for monitoring the rapidly changing coastal marine environment and using this information in the assessment of a coastal fishery such as the California anchovy is noted. Previous measurements of sea surface temperature and relative chlorophyll concentration suggest that these are two important biological parameters than can be rapidly obtained in a synoptic fashion from a suitably equipped aircraft. Experimental flights with a twin engine Beechcraft Travel Air aircraft equipped with a modified precision radiation thermometer (PRT-5) infrared radiometer and a dual channel differential radiometer (DCDR) for ocean color were made on several occasions in late 1974, and the results from the 4 and 9 October flights are briefly described. Analysis of these flight data suggest that by careful evaluation of the strip chart records, statistically significant relationships can be obtained between both remote sensors. While quantitative results depend upon reasonably frequent ground-truth observations for both radiometers, particularly the DCDR instrument, a rough conversion to mg chlorophyll/m^3 for the DCDR was made based on limited surface chlorophyll *a* measurements and published calibration curves. The results suggest that when the design constraints of the DCDR instrument are recognized and the instrument is used in conjunction with the PRT-5 radiometer the paired radiometers offer considerable potential for monitoring two biologically important parameters in a coastal fishing zone.

Smith, Paul E. 1979. Ecological methods with particular reference to the study of insect populations. Ecology (Book Review) 60(6).

Approved by Center Director

Hobson, E.S., W.N. McFarland and J.R. Chess. Crepuscular and nocturnal activities of Californian nearshore fishes, with consideration of their scotopic visual pigments and the photic environment. Submitted for consideration for publication to the Fishery Bulletin.

Stuntz, Warren E. Update on the tuna-porpoise situation. Submitted for consideration for publication to the Aquatic Ecology Newsletter.

Stuntz, Warren E. The effects of habitat on activity in bluegills. Submitted for consideration for publication to the Transactions of the American Fisheries Society.

Sumida, Barbara Y. and H. Geoffrey Moser. Food and feeding of Pacific hake larvae, Merluccius productus, off southern California and northern Baja California. Submitted for consideration for publication to the California Cooperative Oceanic Fisheries Investigations Reports.

Weihs, D. Effects of swimming path curvature on the energetics of fish motion. Submitted for consideration for publication to the Fishery Bulletin, U.S.

Administrative Reports

Honolulu Laboratory

[Yoshida, H.O.] Country statement - U.S.A. SWFC Adm. Rept. No. H-80-1.

Wetherall, J.A. Estimating monk seal populations using change-in-ratio and least squares methods. SWFC Adm. Rept. No. H-80-2.

Mendelssohn, R. An iterative aggregation process for Markov decision processes. SWFC Adm. Rept. No. H-80-3.

Yong, M.Y.Y. and J.A. Wetherall. Estimates of the catch and effort by foreign tuna longliners and baitboats in the Fishery Conservation Zone of the central and western Pacific, 1965-77. SWFC Adm. Rept. No. H-80-4.

Adams, M.F. A multispecies household production analysis of recreational fishing with dispositional benefits. SWFC Adm. Rept. No. H-80-5.

La Jolla Laboratory

Henderson, J., W. Perrin, R. Miller. Rates of gross annual production in dolphin populations (Stenella spp. and Delphinus delphis) in the eastern tropical Pacific, 1973-1978. SWFC Adm. Rept. No. LJ-80-02.

Alvariño, A. The relation between the distribution of zooplankton predators and anchovy larvae. SWFC Adm. Rept. No. LJ-80-03.

Perryman, W. School size estimates and other results from aerial photographs taken during the 11 October-24 November cruise of the F/V Gina Anne. SWFC Adm. Rept. No. LJ-80-04.

Perryman W. and T. Foster. Preliminary report on predation by small whales, mainly the false killer whale, Pseudorca crassidense, on dolphins (Stenella spp. and Delphinus delphis) in the eastern tropical Pacific.

Stuntz, W. Variation in age structure of the incidental kill of spotted dolphins, Stenella attenuata, in the U.S. tropical purse-seine fishery.

HONOLULU LABORATORY

RESOURCE ASSESSMENT AND DEVELOPMENT INVESTIGATIONS (RADI)

NOAA Research Vessel Townsend Cromwell Departs on Cruise to Assess Marine Resources of Northwestern Hawaiian Islands

The NOAA ship, Townsend Cromwell, departed Honolulu on March 24 on cruise 80-02 in a continuation of planned work to survey and assess the marine resources of the Northwestern Hawaiian Islands (NWHI). Participating in the cruise are Reginald M. Gooding, Chief Scientist, and Research Assistants Victor A. Honda, Robert L. Humphreys, Jr., Bert S. Kikkawa, and James H. Prescott.

Gooding reported that the cruise missions include trapping and predation experiments with spiny lobster (Panulirus marginatus), bottom longlining experiments, surveys of several unexplored seamounts in the vicinity of Midway and Kure Islands, and a population census of Hawaiian monk seal, Monachus schauinslandi, at several islands in the NWHI. Gooding indicated that the scientists on the Cromwell will be working closely with several wildlife biologists who are already in the NWHI conducting an extensive study of the monk seal population.

Researchers Complete Manuscripts for Northwestern Hawaiian Islands Symposium

Richard N. Uchida, Leader, Insular Resources Task, reported that researchers in this Task completed 11 manuscripts for the symposium, "Status of Resource Investigations in the Northwestern Hawaii Island," which will be held at the University of Hawaii on April 24 and 25. These manuscripts discuss results of ongoing work in the NWHI on the spiny lobster, bottom fish, seamount, and coastal pelagic resources.

Periodicity of Growth Patterns on Otoliths Studied

In a continuing attempt to determine the periodicity of growth patterns on fish otoliths, James H. Uchiyama, Fishery Biologist, sampled otoliths from tetracycline-treated (fed or injected in January) carangids, Caranx sexfasciatus, C. melampygus, and Trachurops crumenophthalmus, and a mullid, Parupeneus pleurostigma.

Uchiyama, assisted by Research Assistants Martina K.K. Queenth and Sharon D. Hendrix, also injected seven skipjack tuna, Katsuwonus pelamis, with tetracycline on March 4. Six skipjack tuna, which received interperitoneal injections, appeared to swim normally after the treatment, whereas one

skipjack tuna, which received an intramuscular injection, appeared to show signs of distress, was unable to flex its body normally, and consistently swam into the side of the tank.

Uchiyama also discussed otolith studies with Alex Wild of the Inter-American Tropical Tuna Commission who was visiting the Honolulu Laboratory. They reviewed the definition of daily growth increments of otoliths and discussed methods of interpreting daily growth increments under various conditions, particularly in skipjack tuna. Wild also demonstrated his method of preparing acetate replicate "peels" from the very thick and opaque otolith of a grouper, Epinephelus quernus.

Maximum Sustainable Yield Estimated for Hawaiian Bottomfish

Dr. Jeffrey J. Polovina, Statistician, Research Assistant Darryl T. Tagami, and Stephen Ralston, University of Washington graduate student, completed an analysis of bottomfish production in the major Hawaiian Islands for the period 1959 to 1978 using commmercial catch data from the Hawaii Division of Fish and Game. Estimated maximum sustainable yield (MSY) for all commercial species of bottomfish ranged from a low at Oahu of 105 kg/nmi/yr along the 100-fathom contour to a high of 272 kg/nmi/yr. They also estimated the virgin biomass which ranged from a low for Oahu of 651 kg/nmi along the 100-fathom contour to a high of 1,660 kg/nmi along the 100-fathom contour for the Maui-Molokai-Lanai bank.

* * * * * * * * * *

Research Assistants Linda C. Hubbell, Tagami, and Bernard M. Ito continued sampling kahala, Seriola dumerilii, for ciguatoxin analysis. Hubbell also continued measurements of ova from kahala ovaries for tests to determine the rate at which the ova develop in different parts of the ovaries.

Tagami also continued working with Dr. Polovina on input data for the ecosystem model being developed for the French Frigate Shoals area and assisted Kikkawa and Honda with the statistical analysis of data on the distribution of ovarian ova in the opakapaka, Pristipomoides filamentosus, and the spiny lobster.

Hawaiian Skipjack Tuna Landings Continue Below Long-Term Average

The March 1980 Hawaii landings of skipjack tuna were estimated at 12 metric tons (MT), which is 90 MT below the March 1979 landings and 93 MT below the 1964-79 long-term average for March. The cumulative landings from January through March were estimated at 92 MT, which is 137 MT below the 1979 landings for the same period and 225 MT below the 1964-79 long-term average for the same period.

FISH-ENVIRONMENT INVESTIGATIONS (FEI)

New Procedures Tested for Induced Swimming in Tunas

Dr. Andrew E. Dizon, Leader, Experimental Ecology of Tunas, notes that for future planned research on energetics, biochemistry, and hydromechanics of skipjack tuna, it is desirable to maintain a situation where measurements can be made and samples withdrawn from a swimming fish. Because of the delicate nature of tunas and their high swimming speed, work of that nature requires either a water tunnel or sophisticated acoustic telemetry devices. Both are impractical for many sensors or for chemical samples. Also, past work with tunas indicates that they barely tolerate a flume-type water tunnel.

An alternative is to induce swimming behavior in a fish that is restrained, as long as the restraint allows freedom of movement in the latter two-thirds of the body. Swimming movements are approximated by the coordinated movements of the posterior part of the fish and measurements can be made and samples withdrawn via cannulus.

Electrical stimulation of the brain and spinal cord of fishes will induce locomotory movements but it has never been attempted on tunas or other high performance fish. Dr. S.M. Kashin of the Institute of Oceanology, Moscow (USSR), one of the pioneers in using this technique for inducing swimming in fishes, is spending a one-year academic leave at the UCLA laboratory of Dr. Malcolm Gordon. At Dizon's invitation, Kashin agreed to demonstrate the technique on skipjack tuna. Dr. T. Wu of California Institute of Technology, who is also interested in developing this tool for his anticipated hydrodynamic work on skipjack tuna in Honolulu, sponsored Kashin's trip to Honolulu.

The results of one week's work were very encouraging. Kashin, with the assistance of Dr. Richard W. Brill of the Pacific Game Fish Foundation, Walter Ikehara of the University of Hawaii Zoology Department, and Dizon was successful in inducing coordinated swimming movements in restrained skipjack tuna. Square wave stimulus pulses (80 Hz, 10 msec duration, 1-5 V amplitude) induced swimming motions immediately or within a few seconds after the onset of stimulation and ceased as soon as the stimulus was halted. The operation, conducted under heavy sodium thiopental anesthetic, requires only a very small cranial opening directly above the cerebellum. A monopolar, stainless steel electrode is inserted into the brain stem about 1 cm below the surface of the cerebellum.

It is believed that this procedure is a practical alternative for creating locomotory activity which can be controlled and monitored. Since fish survived and responded for up to 8 h, many experimental approaches for studying the physiology, biochemistry, and engineering aspects of high-speed swimming in tuna now appear to be possible.

Green Turtle Studies Planned

Lt. H. A. Jemison, NOAA Corps, Steve Kramer, Fish and Wildlife Service-sponsored Young Adult Conservation Corps trainee, and Dr. A. Dizon continued preparations for the upcoming investigation of nesting green turtle, Chelonia mydas, at the French Frigate Shoals Wildlife Refuge. This study involves the deployment of radio tracking transmitters on turtles to obtain movement and temperature information during periods between nesting activities. Locations will be pinpointed using triangulation from two shore-based stations located at Tern Island and East Island, about a 7-mile separation; temperature will be telemetered using pulse rate modulation. In addition, two internal temperature-sensitive transmitters will be employed to examine thermal regulation of basking turtles. Team members for the 3-week expedition to French Frigate Shoals will be George H. Balazs, turtle expert from the University of Hawaii Institute of Marine Biology, Dr. C. Whittow, thermoregulation specialist from the University of Hawaii Department of Physiology, Jemison, S. Kramer, and Dizon.

To date, equipment has been selected and ordered for the study. The heavier pieces, such as antenna rotors and masts, were purchased or fabricated and loaded last week on the Townsend Cromwell for shipment to the Refuge. Twelve transmitters are currently being fabricated and will be ready by May 1. All electronics will be tested and evaluated for range and accuracy during preliminary tests in May and then airshipped to French Frigate Shoals.

Last week a dummy transmitter was successfully attached to a captive animal at Sea Life Park in Honolulu. So far the unit has been in place 5 days. The first attempt ended in failure when one of the tank mates of the test animal was attracted to the shiny transmitter and wrenched it off. This problem was avoided by camouflaging the unit with dark green paint.

Behavioral Thermoregulation Studies Continue

Dr. Dizon reported that the dumb bell tank used in the behavioral thermoregulation test system is in operation again. Last month Dizon and M. Queenth tested the first yellowfin tuna in this tank. If similar results are obtained as with the first fish, it would appear that yellowfin tuna prefer waters considerably warmer than those found in local waters. The system allows the test fish to regulate its own environmental temperature by appropriate movements in the tank complex. Failure to do so will allow the system to drift towards lethal temperatures of 35° or 15° C, the tank limits.

Experiments to Induce Spawning in Tunas Reinstituted

Monthly biopsy procedures to monitor ova diameters of the Laboratory's breeding stock of kawakawa, Euthynnus affinis, were reinstituted after the 2-month winter rest period. Martina Queenth measured ova diameters of up to 0.16 mm, slightly up from a winter low of 0.11 mm. Before spawning can be induced, ova diameters must reach a size above about 0.55 mm.

Research Assistants Thomas K. Kazama and S. Hendrix continued preparation of the culture system for the anticipated summer's crop of tuna larvae. Dr. Calvin M. Kaya of Montana State University will be returning to Honolulu again for 2 months this summer to oversee the spawning work. In addition to kawakawa, attempts will be made to induce yellowfin and skipjack tunas to spawn.

Townsend Cromwell Refurbishing Meeting Held

Heeny S. H. Yuen, Leader, Recreational Fisheries Task, reported that a week-long meeting was held with representatives from the Office of Fleet Operations, National Ocean Survey, and a naval architecture and engineering firm on the Cromwell's mid-life refurbishing. Other Honolulu Laboratory personnel at the meeting were R. Uchida, Paul M. Shiota, and James H. Uchiyama.

LA JOLLA LABORATORY

Coastal Fisheries Resources Division

ALBACORE FISHERIES PROGRAM

Presentations on Albacore Research Made to Fishermen's Groups

Dr. R. Michael Laurs, Leader of the Albacore Fisheries Program, delivered several presentations during the past two months to albacore fishermen's groups totaling about 200 persons, including the Board of Directors of the Western Fishboat Owners Association (WFOA), the General Membership meeting of the WFOA, and the Board of Directors of the American Fishermen's Research Foundation. He discussed the 1979 albacore fishing season and possible reasons contributing to the poor landings made by U.S. flag vessels, results from the cooperative NMFS/AFRF albacore studies conducted in 1979, and a summary of what has been learned from the cooperative NMFS/AFRF tagging program including information on stock structure, large-scale and small-scale migration patterns, growth rate and the special tagging/tetracycline injection study for albacore aging. In addition, he described findings made during acoustic tracking studies on the variations in depth distribution of albacore and ocean temperature at the depth of swimming of albacore. In all cases the presentations were very well received and there was a lively question and answer period.

Plans Made for 1980 Albacore Studies

Dr. Laurs also met with the Board of Directors of the AFRF this month to discuss plans for albacore research/scouting for 1980. AFRF derives its revenues for conducting albacore research/scouting cruises from an assessment fund by the canners on albacore landed by U.S. flag vessels. Because of the low U.S. albacore landings made in 1979, the revenues available to AFRF for research/scouting in 1980 are much less than in past years, and it is, therefore, necessary to cut back on the scope of activities for 1980.

After considerable discussion it was decided that the following projects will be carried on with available funds: (1) reimbursement for albacore tagged and released by fishermen fishing in the western Pacific; twelve vessels will be provided 100 tags each and training in tagging methods (most of the fishermen selected already have tagging experience) by staff at the La Jolla Laboratory; AFRF will make payment for each fish tagged and released determined from a length: weight table based on the fork length of the fish measured at the time of release, (2) four vessels will be paid a fuel subsidy for early season scouting/tagging operations with each vessel reporting information on fishing and weather conditions for dissemination to the fleet on a daily basis for a 30-day period (two of the vessels will operate north of

Eureka beginning in late June), and (3) one vessel will be chartered for the month of August to conduct exploratory fishing and tagging in waters several hundreds of miles off the Pacific Northwest beyond where the U.S. fishery generally operates in an attempt to learn more about the migration pattern followed by the northern substock of albacore.

In addition, AFRF decided to submit a proposal for Saltonstall-Kennedy funding to evaluate the feasibility of establishing a U.S. fishery on the southern substock of albacore in waters between the U.S. west coast and the Hawaiian Islands during winter months.

* * * * * * * * * * *

From left: Fishery Biologist Robert Nishimoto discusses plans for albacore research in 1980 with Ron Lynn, Oceanographer, and Dr. M. Laurs, Leader of the Albacore Fisheries Program at the La Jolla Laboratory.

LARVAL FISHES, COASTAL EAST PACIFIC

Daily Layers in Otoliths of Young Fish Reveal Entire Growth History of Individual

The daily layers in the otoliths of larval and juvenile fish contain much more information than the age of the individual, according to Richard Methot, graduate student at SIO, who has been measuring the widths of these growth increments and then backcalculating the entire growth history of each individual.

Precise measurements of increment size are made with a microcomputer system. Otoliths are viewed on the monitor of a video system attached to a light microscope. A cursor (pointer) is electronically inserted into the video image. The observer positions the cursor at an increment, enters, via keyboard the number of increments between the point and the last point entered, and then sends the current coordinates of the cursor to the computer. The microcomputer processes this data to obtain increment size as a function of otolith radius. These increment size data are converted to fish growth rates by a Gompertz equation relating otolith radius (R) to fish length (L):

$$R = 3.70 * \exp(.218/.035 * (1-\exp(-.035 * L))) \text{ for } L = 5 \text{ to } 110 \text{ mm.}$$

Anchovy born in May 1979 were sampled as 15-25 mm larvae in June 1979 and as 30-45 mm transforming larvae in August 1979. Growth rates were back-calculated for the 5-45 mm size range. Growth increased from 0.35 mm/day at 5 mm to 0.65 mm/day at 10 mm. Laboratory-reared, ad libitum fed larvae grow at the same rate.

Growth declined after 10 mm and reached a minimum of 0.22 mm/day at 30 mm. Laboratory-reared larvae will continue to grow rapidly through this 10-30 mm size range if provided with abundant, large prey items. Through this size range, wild anchovy larvae perform a daily vertical migration, begin aggregating, and tend not to have large prey items in their guts. The depressed growth rate may be due solely to the low availability of appropriate food (primarily copepodids and small copepods). However, the onset of aggregation may indicate that it is advantageous for survival of a late larva to reduce its susceptibility to predation rather than maximize foraging time. Much more work must be done to determine if this late larval stage is a second critical period for anchovy.

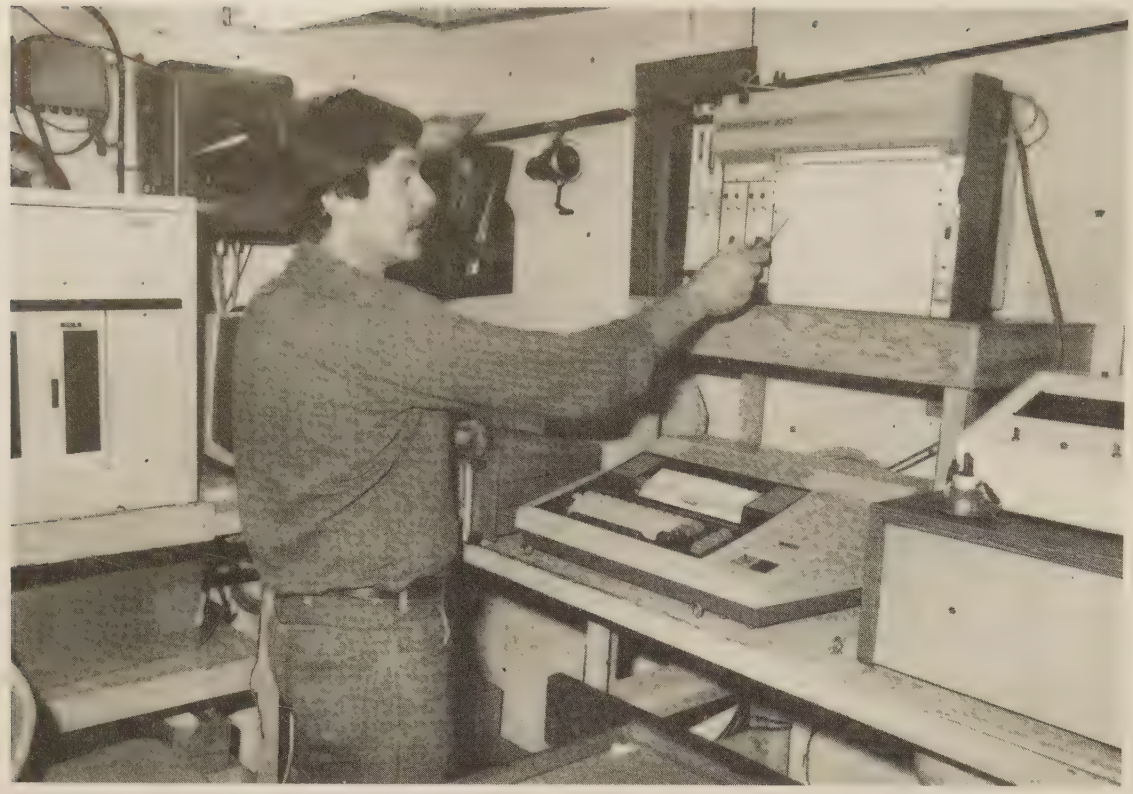
By 40 mm, growth has increased to .4 mm/day and metamorphosis has started. The gut is now differentiated and the gill rakers are capable of filtering small particles. The increase in growth may be due to reduced energetic cost of feeding on small particles.

Two Important Research Cruises Underway on Jordan & Scripps

Two cruises, important to future research in the Coastal Division, were conducted this month. The NOAA research vessel, David Starr Jordan, began a cruise for the purpose of estimating anchovy biomass, using for the first time, the new egg production method for spawning biomass devised by the staff of the Division. The usual egg and larva survey will also be carried out for comparison. While permission was obtained for conducting the cruise in Mexican waters, a caveat was attached by the Mexican government denying access for surveying within 12 miles of the coast. Efforts by the U.S. State Department and the U.S. Embassy in Mexico City to modify this ruling were successful and resulted in clearance being obtained for inshore sampling late in the cruise. Cruise leader aboard the Jordan was Dr. Gary Stauffer.

With the support of the Marine Life Research Group of the Scripps Institution of Oceanography, the research vessel Ellen B. Scripps was made available to Dr. Geoff Moser and visiting scientist Dr. Tilman Pommeranz from the University of Kiel, to deploy a specially instrumented opening and closing net, the MESSHAI ("measuring shark" in German). The objective was to determine the vertical distribution of fish larvae, particularly anchovies at two stations in the Southern California Bight. Coastal Division members, B. Stevens, E. Sandknop, J. Butler, C. Kimbrell, J. Brown, and B. Sumida-MacCall constituted the scientific staff with Moser and Pommeranz. A variety of samplers and measuring devices were to be employed. Dr. Michael Mullin is to rendezvous with the Scripps during the last half of the cruise to deploy a large plankton pump for capturing copepods and other microzooplankton at various depths.

Dr. Pommeranz examining the hydro-sonde on the Multiple High-speed Zoolplankton Sampler. The hydro-sonde is the electronic sensor which transmits environmental information to the recording instruments.



Dr. Pommeranz checking visual printout of information taken with the sampler in the laboratory of the Scripps Institution of Oceanographer research vessel, Ellen B. Scripps.

Satellite Studies Related to Marine Fishery Resources off California Conducted at Scripps Remote-Sensing Facility

Drs. R. Lasker, Leader of the Coastal Division, and M. Laurs are conducting satellite ocean remote-sensing studies off California utilizing the Scripps Institution Remote Sensing Facility (SRSF) adjacent to the Southwest Fisheries Center. Their objectives are (1) to evaluate the utility of using ocean color, thermal imagery, wind and other measurements to infer ocean turbulence and surface layer transport in year class survival studies of northern anchovy and (2) to investigate the feasibility of utilizing ocean color and thermal imagery to monitor the location and development of ocean fronts that affect the distribution, availability and migration of albacore tuna.

Since January, staff research assistant Margaret Wolfe and Scripps doctoral student, Jose Palaez-Hudlet, have learned the procedures for archiving NOAA-6 and NIMBUS-7 satellite passes and developed a protocol for cataloging ship movements and ocean stations. On virtually every clear day

for the last three months, Coastal Zone Color Scanner (CZCS data from NIMBUS-7 passes have been collected and reformatted for future analysis. Similarly, a series of sequences of useful NOAA-6 infrared imagery for the Southern California Bight has been put on tape.

In relation to the imagery already collected, work was underway this month to locate ocean features geographically to evaluate spatial and temporal variation in prominent features and to verify features with ground truth where possible. Quantitative indices of ocean features are being sought by Lasker to correlate with larval survival of the 1980 anchovy year class.

Laurs also directed the reformatting of NOAA-6 infrared imagery collected by SRSF of a NMFS research cruise conducted in November to study the influence of the Subtropic Front on albacore migration. Ground truth for these pictures was processed and charted this month.

COMMERCIAL AND RECREATIONAL FISHERIES RESEARCH FOR MANAGEMENT

Management Schemes Examined for Possible Modification of Anchovy Plan

Dr. D. Huppert, Task Leader, and A. MacCall, California Fish and Game Marine Biologist, continued to examine alternative management schemes for possible modification of the anchovy plan. During March the effort focused upon a simulation program which mimics a 1000-year period of management with alternative initial conditions, parameters for the equations of motion, random variable characteristics and harvest policies. The strategy is to examine the pertinent characteristics of the fishery (e.g. average catch, average economic return, average population size and variance of catch) under various assumptions and harvest policies. One of the assumptions--density dependence of annual recruitment--has been thoroughly examined by MacCall.

Apparent recruitment to the anchovy population is defined as

$$R_t = B_t - B_{t-1}e^{-(M+F)}$$

where B_t is population biomass at time t and (M+F) is the natural-plus-fishing mortality rate. For the period 1951-1966, the apparent recruitment had an average value of 1.128 million tons with a standard deviation of 1.003 million tons. Dependence of recruitment upon parent stock is supported by the Spearman rank correlation coefficient of 0.65 ($P<0.02$). The best simple regression relationship between R_t and B_{t-1} is

$$R_t = -2554.5 + 522.9 \log (Bt\text{-}1)$$

$$r = 0.32$$

The value of a mid-year recruitment survey is another issue being given substantial attention. Assuming that the current harvest policy continues to determine the initial annual harvest quota (i.e. quota equals 1/3 of biomass

in excess of 1 million tons), the recruitment survey is introduced as a statistical estimate available midway through each year. Response to the recruitment estimate needs to be investigated in more detail, but the initial model has the "manager" adjusting the annual quota up or down in proportion to the deviation of estimated recruitment from expected recruitment. Simulations were run with a wide range of standard errors of recruitment estimates and quota adjustment coefficients (factor of proportionality) ranging from 0 to .9.

Pacific Fishery Council Refers Problems of Jack Mackerel Management to NMFS

The development of a Jack Mackerel Fishery Management Plan continues a slow and difficult course. Last month the Pacific Fishery Management Council responded to the comments of Assistant Administrator for Fisheries, T. Leitzell, by halting the Jack Mackerel Plan process. At the February Council meeting of the Council, it was decided to incorporate the management of the northern segment of the jack mackerel fishery into the groundfish FMP. During jack mackerel team/groundfish team consultations, the striking difference in approach and philosophy between the two plans became apparent. The two teams agreed that (1) incorporation of jack mackerel management is likely to delay implementation of the Groundfish Plan by an additional several months, and (2) it would create further complications in an already difficult Plan. They recommended that the Council refer the problem of jack mackerel management to the National Marine Fisheries Service (NMFS) who can manage the foreign fishery by a Preliminary Management Plan (PMP). The domestic fishery would remain under present management by the individual states. The Council passed this request to NMFS, and is now waiting for official reaction. The Secretary of Commerce once stated that no more PMPs were to be authorized, but on the other hand, there is also a policy that FMP (Fishery Management Plan) development must be justified by relative benefits (which is why Jack Mackerel Plan development was halted).

Statistics Adapted for Estimation of the Egg Production Index for Anchovy

During March Susan Picquelle, Statistician, concentrated on studying the problems associated with the estimation of the daily egg production for anchovy. This value, along with estimates of spawning frequency, fecundity, and sex ratio will be used to estimate the spawning biomass of anchovy, based on the data from the current egg-gonad survey. In particular, Picquelle examined the literature for a temperature-dependent growth equation for the embryonic stages of anchovy. Using the Zweifel-Hunter growth equation, Picquelle drew a graph relating age (number of days from spawn) to temperature for the eleven stages of egg development and various larval lengths. This will be used to assign ages to the egg and yolk-sac larvae sampled by the egg-gonad survey. A mortality function will then be fitted to the plot of egg and larvae abundances (adjusted by duration of developmental stage) with age. The daily egg production can then be estimated by extrapolating this function back to age 0.

Econometric Study of U.S. Fishing Fleet Continues

Economist Jane McMillan reports progress in her analysis of fishing vessel construction in the United States. Regression equations relating the cost of construction to the length of the vessel have been estimated for various gear types and areas. The construction cost data were obtained from the NMFS telephone survey of boat-years and the data on vessels in the United States is from the Vessel Operating Units file, which is compiled by NMFS headquarters office. The construction cost equations are then applied to data on all fishing vessels in the U.S. for the years 1965 to 1976. An estimated "value" for each vessel is thus obtained. The data are then summarized according to 38 gear categories for the east coast, west coast, Gulf of Mexico, and other areas. The following data are summarized for each gear type and area:

- total number of vessels
- total tonnage of vessels
- total length of vessels
- total value of vessels

The above information is also summarized for newly-constructed vessels and for vessels constructed before 1900.

Additional data are obtained from the General Canvas data tape which was sent to McMillan this month from NMFS in Washington. This data tape contains data on landings and values of fish caught in the U.S. by gear and area. The total quantity and value of fish landed by each gear grouping and area are obtained from this tape.

McMillan has spent most of the month working on FORTRAN programs which provide the above information. She has written these programs and tested them on small data sets. The programs will be run on background batch on the VAX computer to minimize expense. The summarized data will then be available for McMillan's continued analysis.

Oceanic Fisheries Resources Division

TUNA RESOURCES PROGRAM

Western Atlantic Skipjack Tagging Cruise Continues

As described in the February 1980 Monthly Report of the Southwest Fisheries Center, the baitboat Rhonda Sue, under charter to NMFS, departed San Diego January 12, arrived in Ponce, Puerto Rico February 4, and began tagging operations February 8. During the first three weeks of operations, between Puerto Rico and Surinam, 61 tuna schools (25 skipjack) were sighted and 199 tuna (185 skipjack) were single tagged.

Between February 28 and March 5, the scientists on the Rhonda Sue sighted 40 tuna schools (10 skipjack, 4 blackfin, 4 mixed skipjack/blackfin, 10 yellowfin or bigeye and 12 unknown). 813 tuna were tagged, and categorized by species and type as follows:

Species	Non-Injected		Injected*	Total
	Single	Double		
Skipjack	393	100	157	650
Blackfin	6	1	3	10
Other**	153	0	0	153
Total	552	101	160	813

*A certain percentage of fish tagged are injected with tetracycline to aid in growth studies.
**Species composition not reported.

Four tuna schools of unknown composition were sighted and 300 tuna were tagged between March 6 and 9.

The Rhonda Sue arrived in Bridgetown, Barbados March 9 to load fuel and provisions and departed on March 13.

Following several unsuccessful attempts to catch bait in waters between Barbados and Guadaloupe, the Rhonda Sue ran to Ponce, Puerto Rico, arriving March 16. Ponce was the location of the best baiting experienced on the cruise.

For the following 9 days, the Rhonda Sue attempted to catch bait in Puerto Rican waters between Ponce and San Juan, meeting with limited success.

On March 25, Dick Evans, Oceanographer with the Tuna/Billfish Resources Program, and Philippe Vergne, Fishery Biologist with Living Marine Resources Inc. (LMR), replaced Fishery Biologists Ronald Rinaldo and Chuck Peters of LMR on the scientific crew. Dave Bickford, NMFS Biological Technician aboard for the first part of the cruise, remained aboard.

The Rhonda Sue departed San Juan March 26 enroute to baiting areas on the south coast of Puerto Rico. Tagging operations will resume when sufficient bait is captured. It is expected that future efforts will concentrate on areas where successful tagging occurred during the first leg of the cruise.

Atlantic Tuna Statistics Submitted to ICCAT

Preliminary 1979 U.S. tropical Atlantic tuna total catch, sample catch and effort, and length-frequency data were summarized by Mathematician Al Coan and Computer Technician Bob Nydam and submitted to the International Commission for the Conservation of Atlantic Tunas (ICCAT). Data from 1979 are submitted, in preliminary form, on March 1 and final form on July 1 as part of ICCAT membership requirements. The data indicate that 9 U.S. purse seiners fished in the tropical Atlantic Ocean in 1979 and caught an estimated 6,203 MT of tuna (3,167 MT yellowfin tuna, 2,810 MT skipjack tuna, 212 MT bigeye tuna and 14 MT miscellaneous species).

The average size yellowfin tuna caught by U.S. seiners in the eastern Atlantic was 94 cm. long and in the western Atlantic 118 cm long. Bigeye tuna caught in the eastern Atlantic averaged 87 cm long. Skipjack tuna caught in the eastern Atlantic averaged 51 cm long and in the western Atlantic 61 cm long.

Preliminary 1979 Atlantic bluefin tuna fishery data, supplied by the Southeast Fisheries Center, were also submitted. Four U.S. purse seiners participated in the fishery and caught an estimated 1,425 MT of bluefin tuna. Handline and sport gears caught an estimated 875 MT of bluefin tuna.

In 1979 size-composition data for foreign-caught Atlantic tunas transshipped to Puerto Rico were collected by Biological Technician Eugene Holzapfel, who is based in Mayaguez, Puerto Rico. The data were summarized and submitted to ICCAT. Over 7,900 yellowfin, skipjack, bigeye and albacore tunas were sampled from catches representing 11,500 MT.

Average fork-length of the fish landed was: 43 cm for yellowfin and bigeye tunas caught by purse seiners, 50 to 52 cm for yellowfin and bigeye tunas caught by baitboats, 46 cm for skipjack tuna caught by baitboats and purse seiners and 92 cm for albacore caught by longliners.

Project is Underway to Analyze Socioeconomic Impact of Various Tuna Management Options

A project is underway to analyze the socioeconomic impact of management options being considered by the International Commission for the Conservation of Atlantic Tunas (ICCAT) in the Eastern Tropical Atlantic (ETA) tuna fishery.

According to SWFC Economist Sam Herrick, the first step in the analysis is to examine the historical pattern of fishing in the ETA tuna fishery in order to estimate baseline projections against which the expected consequences of each management alternative can be compared. Besides the impact on those nations actively participating in the ETA fishery, particular attention will be paid to the effect each alternative might have on the resource-related interests of the nations adjacent to the ETA fishery.

MARINE MAMMAL BIOLOGY AND TECHNOLOGY PROGRAM

1979 Porpoise Life History Data Bases Nearing Completion

Biological Technician Ruth Miller and Biological Aid Lonnie Dick report that the 1979 porpoise life history data from 2,169 specimens collected by NMFS tuna/porpoise observers were edited and will be entered in the SWFC computer data base. To reach this stage involves a number of processes, including rough sorting of specimens, reproductive organ survey, preliminary preparation for age determination work, data coding, keypunching, sorting and computer-editing. This process began in April 1979 and has involved a full year's work. The data will be used in analyses of mortality and reproductive rates, age and sex structure of the population, stock and species characteristics and breeding cycles, all of which are essential in determining the condition of the porpoise stocks.

MARINE MAMMAL ASSESSMENT AND MONITORING PROGRAM

Porpoise Survey Cruise Completed

The 1980 porpoise survey cruise, which began in January, was completed in early March. The cruise involved the research vessels, David Starr Jordan and Townsend Cromwell. Both ships departed their respective ports, San Diego and Honolulu, on January 3 and made stops at Balboa, Panama and Manzanillo, Mexico during the 63-day trip. The vessels surveyed areas of the habitat of tropical porpoise north of the equator and to about 150° W. The distribution of sightings indicated that west of 110° W, spotted and spinner porpoise were narrowly concentrated along the thermal ridge at latitude 10° N. Chief scientists on the vessels were Dr. David Au, aboard the Jordan and Gene Anderson, aboard the Cromwell.

Administrative Law Judge Presides at Porpoise Hearings

Dr. Tim Smith reports that he, Dr. Gary Sakagawa, Dr. William Perrin and James Coe of the La Jolla Laboratory and Dr. William Aron of the Office of Marine Mammals and Endangered Species, Washington, D.C., will be the primary witnesses for NMFS during the hearings before a Federal Administrative Law Judge on proposed porpoise regulations scheduled to be held in San Diego. Preparation for the hearings have included an analyses of sea state conditions as they affect sighting conditions, an analyses of distribution data from research vessels in 1978, 1979 and 1980, and a life table analyses of maximum reproductive rates. These analyses and others will be used during the hearings. Staff personnel that contributed to the preparation were: Rennie Holt, Douglas DeMaster, David Au, Dede Olson, Ken Wallace, Charles Oliver and Tom Polacheck.

Editing of 1979 Porpoise Data Completed

Fishery Biologist Frank Ralston, who supervises the editing of all data collected by NMFS porpoise observers, reports that his staff has completed the editing of all 1979 cruise data. A few 1979 skipper's bridge logs are still outstanding and remain to be edited when they are received. The first 1980 cruise data are beginning to arrive as observers return to port and his staff is proceeding to process those data.

PACIFIC ENVIRONMENTAL GROUP

OCEAN CLIMATOLOGY AND MONITORING

Changes in Structure and Flow of California Current Affecting Fish Populations Historically Monitored with XBTs

A major problem in fisheries science is to understand how environmental changes affect fish populations. Since such fluctuations occur over many scales of time and space, monitoring of environmental changes must be done over similar time and space scales. Fluctuations over small time and space scales can be monitored from research vessels but for large space scales (regional or larger) or for long-time scales (months to years to decades), research vessels are too expensive and ships of opportunity must be used. Sea surface temperature observations are commonly made by many ships of opportunity and are widely used to monitor oceanic changes. Information on subsurface changes is much less abundant and are now commonly obtained with the use of the expendable bathythermograph, known as the XBT.

In 1966, J.F.T. Saur, Oceanographer, then at the U.S. Bureau of Commercial Fisheries Laboratory at Stanford University, started one of the first major XBT monitoring programs, using Matson freighters on a route from San Francisco to Honolulu. His objective was to monitor changes in the structure and flow of the California Current over a period of years. Following closure of the Stanford Laboratory, the program was transferred to Pacific Environmental Group (PEG) in 1971 and expanded under National Science Foundation (NSF) sponsorship as part of the International Decade of Ocean Exploration (IDOE). The NSF funding for the program ended in March 1980 when the IDOE program expired.

During the 15 years of sampling a total of 387 XBT sections was obtained. Although the sections were taken at approximately 2 weekly intervals, sampling intensity varied between years. Sampling was frequent in 1974 in order to establish the scales of ocean variability along the track while in 1971 sampling was sparse due to several shipping strikes.

The XBT data have been used for a variety of purposes. Immediately after collection, the XBT data are sent via radio to NOAA and the Navy for operational use in real time analyses of ocean temperature. After the ship reaches port in the San Francisco Bay area, a technician mails the data to Pacific Environmental Group for digitizing and processing. The digital data have been used in studies of effects of ocean fronts and boundaries on albacore movements, in studies of long-term changes in ocean structure and advection, and most recently in a study of the northward intrusions of warm water along the west coast during "El Nino" years.

Because of the unique nature of the time series data and its long duration, PEG will attempt to continue the XBT monitoring program with assistance from Fleet Numerical Oceanography Center and the Office of Naval Research. Beginning in October 1980, NOAA will fund the ship liaison portion of the program as part of an expanded international effort in global ocean monitoring.

TIBURON LABORATORY

FISH COMMUNITIES INVESTIGATION

Samples of Shortbelly Rockfish Obtained on Oregon Cruise for Distribution Study

Dr. William H. Lenarz, Task Leader of the Rockfish Analysis Task, reported that he and fellow Task members, Candis Cooperrider and Dennis Nakazona, participated in a cruise of the NOAA research vessel, Oregon, March 10-18. The cruise took place between Cordell Banks and Point Sur, and was designed to study the distribution of shortbelly rockfish. Lenarz reported that the cruise was successful despite strong northwest winds much of the time. Samples of shortbelly rockfish were obtained from most of the study area. The material is being processed by Task personnel and should lead to a better understanding of the migrating behavior of the species. In addition, stomach samples were collected for the staff of the Predator-Prey Task.

Weather Hampers Study of Feeding Behavior on Rockfish on Oregon Cruise

Fishery Biologists Tony Chess, Pete Adams, and Susan Smith of the Fish Communities/Predator-Prey Tasks, took over during the second leg of the Oregon cruise, March 18-27. Because gale force winds blew each day in the study area (about 17 miles off Point Ano Nueno near Santa Cruz), they were unable to carry out much of the sampling for food-habit and prey availability studies of shortbelly rockfish described in the original cruise plan. They were, however, able to take general day and night plankton and midwater trawl hauls near the canyon edge within Monterey Bay. This enabled them to test unfamiliar gear, specifically a midwater trawl equipped with a Furuno net monitor and an opening-closing Tucker plankton net.

The Furuno system worked well in providing a clear picture of foot rope-head rope distance, distance off bottom, and of targets entering the trawl opening. A time/depth recorder was used during the first series of tows made with the Tucker net, providing a profile of the depth track of the net with various lengths of tow wire.

Because euphausiids appear to be the primary prey of shortbellies, their plankton sampling efforts centered on determining their day-night distribution patterns. Preliminary analysis of the samples indicate that euphausiids aggregate at night, as expected within the deep scattering layer, in the surface water above 30 fathoms. Their daytime locations, however, are more difficult to pinpoint. The question of whether the animals descend into the depths of canyons or over the shelf edge, or aggregate on the shelf was, however, partially resolved. A fortuituous examination of the trawl after it was set on a large hydro-acoustic target of medium density extending from the bottom to about 12 fathoms above revealed many euphausiids stuck to the mesh

of the liner, indicating that at least some aggregate on the shelf during daylight. This haul was otherwise empty.

Special, Short-Term Rockfish Study Underway

Tina Echeverria, Fishery Biologist on the Rockfish Analysis Task, traveled to parts of Morro Bay, Monterey, Fort Bragg and Eureka, California, March 24-28, 1980, to initiate a special six-month rockfish study. Temporary employees have been hired to sample rockfish catches landed at the above locations as well as the San Fransciso Bay area. The study is designed to provide estimates of age and size at first maturity for the important species of rockfish, estimates of the biological composition of the catch by each type of fishing gear, and as a feasibility study of the use of predator stomach contents for indices of the strength of recruitment of important groundfish.

FISHERIES DEVELOPMENT INVESTIGATION

Shortbelly Rockfish Gains Japanese Name

An event which will undoubtedly aid marketing of shortbelly rockfish in Japan is the publication of a Japanese name for the fish. Dr. Tokiharu Abe, University of Tokyo, will soon publish a description of the fish, giving it the common name of "hime mebaru," which connotes a rockfish (mebaru) that is "small and pretty." The term "hime" also means "princess." The description will be included in the series, "New Faces of Fishes in Japan," which Dr. Abe initiated several years ago to aid consumers to distinguish fishes that have recently started to be imported into Japan. In addition to the description, Dr. Abe gives the proximate analysis, nutritional value, and methods of preparing shortbelly rockfish for the table.

Shortbelly Rockfish Sent to Japan for Consumer Reaction

Samples of whole frozen shortbelly rockfish sent to Japan last month were distributed to several firms by a broker. Favorable reaction was received from catering firms and hotel operators, but not from fish markets. Apparently the fish is acceptable by the consumer as a cooked product, but would probably not sell well in the frozen or thawed, uncooked state. A large commercial sample is required by the broker for test marketing. Following that test, and approval of price and quality, the Tiburon Laboratory, expects to receive a substantial order for shortbelly rockfish.

Research Vessel Oregon Encounters Bad Weather

Sus Kato, Roger Green, Daniel Ralph, and Lt. Patrick Rutten were aboard the research vessel, Oregon, from March 27-30 to attempt to catch shortbelly rockfish and euphausiids near Monterey, California. Due to rough weather,

however, no fishing was attempted except for a couple of trial tows at night for euphausiids.

PHYSIOLOGICAL ECOLOGY INVESTIGATION

Field Sampling Plans Completed for Striped Bass Research in 1980

Dr. Jeannette Whipple, Investigation Leader, reports that preparations and planning were completed for field sampling of striped bass for spawning year 1980. Data analysis for previous years is nearing completion, and a manuscript is being revised by Whipple for publication, including results on the effects of pollutants on striped bass in the San Francisco Bay area.

Ten fish were collected as an end-of-winter sample of striped bass. Autopsies were performed by Whipple and staff, and subsamples were taken for pollutant analyses, including samples of muscle, liver, ovaries and testes, and sent to Dr. Donald Gadbois, Gloucester NMFS Laboratory for PCB and DDT/DDE/DDD analyses.

In other developments of striped bass research, Dr. Mike Moser, University of California, Santa Cruz, has begun identification of parasites and lesions in 1979 samples of striped bass, including analyses of the abundance and severity of parasitic infestations.

Nina Hirsch and Richard Pimentel, employed by San Francisco State University to work on pollution effects on striped bass under contract, are collecting striped bass for laboratory experiments. Apparatus designed for the long-term exposure of the bass in these experiments is nearly complete, and experiments are planned to begin in about two weeks.

Fishery Biologist Mickey Eldridge reviewed striped bass spawning and culture methods with personnel of the South Carolina Wildlife and Marine Resources Striped Bass Hatchery at Moncks Corner, South Carolina. Valuable experience was gained in the capture and spawning of adults and the rearing of the larvae. Spring spawning activities had just begun and he was able to witness the procedures in action.

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The new 5880 Hewlett-Packard Gas Chromatograph (GC) has arrived. Pete Benville, after completion of a training course, is in the process of setting up the GC and continuing analyses of striped bass samples for petrochemicals. A Physical Science Technician, Robert Hamilton, was hired and is assisting Benville with chemical analyses.

A Biological Aid, Karen Taberski, has been hired and is being trained to assist in histopathological autopsies and the measurement of blood parameters.

SOUTHWEST REGIONAL DATA MANAGEMENT AND ADP OPERATIONS

FIN Contract Awarded To Science Applications

Fred Kellenberger, Data Systems Manager, reports that the Fishery Information Network (FIN) contract with the State of California, has been awarded to Science Applications, Inc. (SAI). SAI will determine how the present California Department of Fish and Game (CF&G) marine fisheries statistics system can be improved to be more responsive to the needs of NMFS, the Regional Councils, State, industry and the general public. The study will track basic fisheries information in its flow through the CF&G and to the Southwest Fisheries Center and Region.

Specifications Completed for Tuna Data Management Systems

The specifications for the Tuna Data Management System (TDMS) have been completed and they are being reviewed by Al Coan, Fletcher Riggs and Kellenberger. The specifications detail the data requirements needed to satisfy the SWFC and SWR tuna data needs. The TDMS will contain biological, catch effort, environmental, socio-economic, and total catch data for analysis, modeling, enforcement and management. Data will be gathered from a variety of sources, including various offices in the SWFC and SWR, other NMFS offices, other federal agencies, state, foreign countries, FAO, wholesalers, retailers, processors, commissioners, etc.

Status of PACES Discussed at Meeting

On March 7, Kellenberger, Dorothy Roll and Robert Butler attended a meeting at Long Beach, California; others participating were Gary Smith and Gary Galbreath from the Southwest Region (SWR) and Richard Heimann, Leo Pinkas and Russ Goodrich from the California Department of Fish and Game (CF&G). The purpose of the meeting was to discuss the status of PACES (Pacific Cooperative Enforcement System) and to clarify the input and output requirements for the system. In order to implement PACES fully, Butler is updating the USERS Manual and reviewing and documenting the operational procedures for the system. PACES will begin operations in April 1980 for the SWR and CF&G.

Other Developments in Data Management

Another summary tape of the California Fish and Game Sportfish Catch data has been sent to Richard Parrish of the Pacific Environmental Group at Monterey for his review. This tape is summarized by an origin block and contains the following information: species code, date, boat hours, anglers, total hours fished and number of fish caught.

Contract specifications for development of data transfer facilities on a micro-computer have been completed by NOAA Corp Officer, Lt. Mark Sullivan. The specifications call for the ability to transfer data between all large computer systems being used in the La Jolla Laboratory and the loading of Hewlett-Packard data tapes produced on board the NOAA research vessel, David Starr Jordan.

On March 5, a PASCAL question and answer session was conducted at the La Jolla Laboratory's auditorium by Jim Madden, the chief system's programmer at UCSD's Computer Center. The purpose of the session was to clarify the capabilities of PASCAL in terms of how it can satisfy some of the Laboratory's computing requirements. PASCAL is a relatively new high-level computer language which has been implemented on large scale computers and mini-computers.

MISCELLANEOUS

HONORS AND AWARDS

Honolulu Laboratory

Richard N. Uchida was selected as the Honolulu Laboratory's nominee for Federal Manager of the Year and Howard O. Yoshida as the nominee for Federal Employee of the Year for the Honolulu-Pacific Federal Executive Board's calendar year 1979 awards. The award winners will be announced at the annual Federal Day luncheon which will be held this year on Friday, May 2, 1980.

La Jolla Laboratory

At a brief ceremony in the Southwest Fisheries Center Auditorium on March 5, Lloyd Farrar, Port Captain for the NOAA research vessel, David Starr Jordan, based in San Diego, received the NOAA Bronze Medal at the hands of Admiral Eugene A. Taylor, Director of the National Ocean Survey's (NOS) Pacific Marine Center in Seattle, Washington. In presenting the award to Farrar, Admiral Taylor cited his "exemplary leadership, efficiency, and ingenuity in the effective operations of the Jordan." In addition to the Bronze Medal Award, Admiral Taylor presented Farrar with an award for his outstanding contributions to the Global Weather Experiment.

Izadore Barrett, Center Director, noted that Farrar began his career with the Fisheries Service in 1956 as a Fishery Aid, later progressing to the position of Assistant Marine Operations Supervisor for the research vessel, Black Douglas, and then as Marine Operations Supervisor for the Jordan. In 1973 when the National Ocean Survey assumed responsibilities for the operation of NOAA's research fleet, Farrar was administratively transferred to NOS, although he remained responsible for Jordan operations and engineering support in San Diego.

Also attending the ceremony were Terry Leitzell, NOAA's Assistant Administrator for Fisheries, Dr. William Fox, Director of the Southeast Fisheries Center, Dr. Robert Edwards, Director of the Northeast Fisheries Center, Dr. Murray Hayes, Acting Director of the Northwest Fisheries Center, and Dr. Lamarr Trott, Chief, Resource Assessment Division, all of whom were participating in a Center Directors' meeting at the Southwest Fisheries Center that day.

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Harold B. Paul, Second Assistant Engineer on the David Starr Jordan, is awarded a certificate for superior performance by Milton Roll, Captain of the Jordan.

SEMINARS

La Jolla Laboratory

March 18 - Dr. Edmund S. Hobson, Tiburon Laboratory, presented a talk entitled, "Comparison of Hawaii and Californian Fish Communities."

Tiburon Laboratory

March 26 - The ninth joint seminar with San Francisco State University/Tiburon Laboratory was held at the Tiburon Center for Environmental Studies (San Francisco State University). The seminar was presented by Dr. Steven Obrebski, Co-director and Resident Ecologist from Tomales Bay Marine Laboratory, Marshall, California, and entitled: "Experimental Studies of Benthic Communities in Tomales Bay, California."

TRAINING

La Jolla Laboratory

March 16-21 - B. Engstrand, Administrative Assistant, was in Seattle to attend a Supervision and Group Performance training course.

26-27 - A cardio-pulmonary resuscitation course for divers was held at the Center.

31 - A brief demonstration was given on the use of emergency oxygen units, now located at strategic places throughout the building, and some general first aid techniques to everyone interested.

PUBLIC AFFAIRS

La Jolla Laboratory

March 6 - Instructor Clabby and 15 students from Admiral Standley Junior High School, San Diego, visited the Center to view the slide show on the Center's research activities and later toured the laboratories and other research facilities. Tour host was Betsy Stevens, Biological Technician at the La Jolla Laboratory.

13-14 - Eight scientists from the People's Republic of China were at the Center to attend a planning meeting in connection with the forthcoming cruise of the NOAA research vessel, Oceanographer, to conduct research off the China coast, the first such cruise by a U.S. ship since 1945.

Pacific Environmental Group

March 5 - David Husby traveled to King City, CA to present a seminar to the King City High School Civics class.

Tiburon Laboratory

March 6 - Ed Ueber sponsored a tour of the Tiburon Laboratory for the students of the Cathedral School for Boys, San Francisco, CA. The tour was expertly conducted by Daniel Ralph and Lt. Patrick Rutten, and covered salmon rearing practices, sexual differentiation, and environmental conditions in the San Francisco Bay.

VISITORS

Honolulu Laboratory

March 3 - Maurice C. Keppel, Director, Staff and Classification Division, Public Service Board, Victoria, Australia, visited R. Shomura.

4 - Syosaka Takahashi and Kohachi Hayashi, Tohoku Regional Fisheries Regional Fisheries Research Laboratory, and Akira Kakimoto and Atsushi Fukui, Tokai University, met with R. Shomura and R. Uchida.

17 - Steve Feldkamp, University of Hawaii, discussed Hawaiian monk seal research and contract study with R. Shomura.

24 - Mike A. McCoy, Micronesian Maritime Authority, Ponape, and Bernie Hill, University of Washington, discussed tuna data with R. Shomura and Dr. Wetherall.

26 - V. Gopalkrishnan, FAO/UNDP, Tarawa, Kiribati, Brenden Dallay and Roniti Temaki, Republic of Kiribati, Hilmar Kristjonsson, Via G. Beltrame 4, Acilia, Rome, and Robert Stone, Lami, Fiji Island, met with R. Shomura and W. Matsumoto to discuss fish aggregation devices.

- Robert Hitz, Pacific Marine Center, Seattle, visited R. Shomura.

27 - Dr. Robert Kearney, Skipjack Programme Coordinator, South Pacific Commission, Noumea, New Caledonia, arrived in Honolulu to work on the final draft of the Shimizu workshop report with R. Shomura, Dr. Wetherall, Fletcher V. Riggs, and H. Yoshida.

28 - Anthony Nizetich, Director of Government Relations, Star-Kist Foods, Inc., Terminal Island, CA, discussed the Indian Ocean Fishery Commission's 6th Session with R. Shomura.

La Jolla Laboratory

March 5-7 - Dr. Murray Hayes, Acting Director, Northwest and Alaska Fisheries Center, Dr. William Fox, Director, Southeast Fisheries Center, Dr. Robert Edwards, Director, Northeast Fisheries Center, Dr. Lamarr Trott, Chief, Resource Assessment Division, and Mr. Terry Leitzell, Assistant Administrator for Fisheries attended the Center Directors' meeting at the Center.

6 - Admiral Eugene A. Taylor, Director, Pacific Marine Center, National Ocean Survey, Seattle, Washington.

- Dr. Roger Coombs, Fisheries Research Division, Wellington, New Zealand.

- Chris Francis, Fisheries Research Division, Wellington, New Zealand.

- Clarence Paultzke, Pacific Marine Fisheries Commission, Portland, Oregon to discuss the coastwide system study with Fred Kellenberger.

7 - Mrs. Terry Leitzell and sons, Charles and Thomas, Washington, D.C.

17-19 - Sharon Lundin, Chief, Employee Services for NASO in Seattle, WA. There was a meeting for all Center staff at which Lundin described the services performed by her group. Subsequently, Lundin was available to Center employees for career counseling. She also met with all Center supervisors to discuss merit pay and performance standards.

19-20 - Ed Pastula, NMFS, Fx52, Washington, D.C.

20 - Duane Peterson, Fred Thorsteinson of NMFS Juneau, AK and Ted Merrel, NMFS Auke Bay, AK.

- John Goodman, Offshore Logistics Fisheries, Lafayette, LA.

- Dr. Herb Kunpf, NMFS Southeast Fisheries Center, Miami, FL.

24 - Lewis J. Bledsoe, University of Washington at the Center to present details of a fishery simulation model.

25 - Chuck Patterson, Commerce Personnel Office, Washington, D.C.

27 - Mary DiGiulian, Fx54 and Gary Wood, F/CM5 visited the Center to meet with staff on the foreign observer program.

28 - David Garrod, Fisheries Laboratory, Lowestoft, U.K.

31 - Mirco Snidero, Deputy Assistant Administrator for Services and Systems, Office of Management and Budget, NOAA.

Pacific Environmental Group

March 7-21 - Philip Law and Paul Wild, California Dept. of Fish and Game, Menlo Park, CA and Monterey, CA, respectively.

Tiburon Laboratory

March 4 - Marvin Jung, State Water Resources Control Board, Sacramento, CA.

17 - Stephanie Cincotta, Port of San Francisco, San Francisco, CA.

- Dana Ripley, ARCO San Francisco, CA.

20 - Bill Kockelman, U.S. Geological Survey, Menlo Park, CA.

- Philip Meyer, Center for Natural Areas, Davis, CA.

- John K. Sustar, U.S. Army Corps of Engineers, San Francisco, CA.

- Roy A. Walters, U.S. Geological Survey, Menlo Park, CA.

24 - Rosemary McConnell, The Ministry for Conservation, East Melbourne, Australia.

25 - Judith Ayres, Harvard University, Cambridge, MA.

MEETINGS AND TRAVEL

Honolulu Laboratory

March 6 - Dale Coggeshall and Craig Harrison, Fish and Wildlife Service, Honolulu, Larry Pank, Animal Damage Control, Hilo Office, and Cameron Kepler and John Sincock, Research Wildlife and Ecological Division, Patuxent, Maryland, discussed NWHI research with Richard S. Shomura, Director, Honolulu Laboratory, R. Uchida, and John J. Naughton of Western Pacific Program Office (WPPO), Southwest Region.

March 11 - R. Shomura held a meeting with Drs. Michael F. Adams and Jerry A. Wetherall, H. Yuen, and Howard O. Yoshida to discuss the billfish Fishery Management Plan (FMP).

12-14 - Dr. Wetherall traveled to La Jolla.

13 - In lieu of R. Shomura, Doyle E. Gates, WPPO, convened a meeting of the Billfish Plan Development Team to review the latest draft of the Billfish FMP. Team members from the Honolulu Laboratory present at the meeting were Dr. Adams, H. Yuen, and H. Yoshida.

17 - R. Shomura discussed the billfish FMP with Drs. Adams and Wetherall and H. Yoshida.

18 - R. Shomura met with George W. T. Liao, Ray F. Sumida, Dr. Wetherall, and H. Yoshida to discuss the American Samoa sampling program.

- Dr. Adams, Gary L. Kamer and James C. Cooper met with representatives from SMS Research to discuss the wholesale fish dealers survey.

24 - Mary T. DiGiulian, Evaluation Staff, Office of Policy and Planning, NMFS, Washington, D.C., discussed the foreign observer program with R. Shomura, G. Liao, and R. Shomura.

25 - R. Shomura attended the Pacific Tuna Development Foundation meeting at the Ilikai Hotel.

27 - R. Shomura, A. Dizon, H. Yuen and W. Matsumoto attended the "Ho'olana" (launching) ceremony for the Statewide Fish Aggregating System project at the University of Hawaii Marine Center's Snug Harbor.

La Jolla Laboratory

March 2-6 - M. Laurs traveled to Washington, D.C. and Atlanta, GA to attend a NOAA research demonstration/NOSS and user working group meeting.

4 - David Mackett traveled to Terminal Island to attend a meeting on State Federal matters.

4-5 - J. Jennings and R. Stives traveled to Mesa, AR to attend a meeting on a Hawaii satellite tracking test.

7 - Fred Kellenberger, Dorothy Roll and Robert Butler traveled to Long Beach to discuss PACES with the SWR and CF&G.

9-11 - Dr. T. Smith traveled to Seattle, WA to consult with Northwest and Alaska Fisheries Center personnel on the status of porpoise stock work.

9-15 - Dr. William Perrin was in Seattle, WA to take part in a meeting of the U.S.-U.S.S.R. Marine Mammal Project.

11-14 - Fred Kellenberger traveled to the SEFC to attend the National Data Management Meeting, and to Washington, D.C. to discuss computer contracts with NMFS, NOAA and DOC.

17 - Director Barrett attended a San Diego Underwater Parks Committee meeting in his capacity as Chairman.

18-19 - Deputy Director Carr attended a National Environmental Assessment meeting in San Diego.

19 - David Mackett participated in a MARMAP operational plan sampling meeting.

- Barrett attended a CalCOFI meeting at the Center.

19-22 - Director Barrett was in Seattle, Washington to attend the Pacific Fishery Management Council's Scientific and Statistical Committee meeting.

24 - Dr. Lasker visited the Lockheed Marine Science Center in Carlsbad to discuss contracting possibilities.

31 - Barrett attended the first-day session of the Tuna/Porpoise hearings in Sumner Auditorium at the Scripps Institution of Oceanography.

25-28 - John Hunter traveled to Palo Alto to attend a policy meeting at Stanford Research Institute sponsored by the Environmental Protection Agency.

Pacific Environmental Group

March 12-13 - Dr. Richard Parrish traveled to La Jolla, CA to attend an Albacore Planning meeting.

23-25 - Donna Mallicoate traveled to Long Beach, CA to pick up anchovy data for return to Monterey.

Tiburon Laboratory

March 1-2 - Sus Kato traveled to San Francisco, CA to meet with Japanese importers who are attempting to develop markets in Japan for several underutilized fish species.

5-6 - Sus Kato traveled to San Diego, CA to attend a meeting called by the California Department of Fish and Game, to hear fishermen's complaints concerning liming operations conducted by the local kelp harvester.

7 - Norman Abramson, Roger Green, and Daniel Ralph of the Tiburon Laboratory, attended a meeting with members of the Tyee Club and Dr. Erwin Seibel, Tiburon Center for Environmental Studies, to discuss the salmon program. The meeting was held at the Tiburon Center for Environmental Studies.

11-13 - Ed Ueber chaired the Groundfish Plan Development Team meeting held in Seattle, WA and also presented the Groundfish Plan to the Pacific Fishery Management Council.

13 - Sus Kato attended a Sea Grant Meeting in South San Francisco, CA to review Sea Grant's projects dealing with fisheries.

14,15 & 18 - Sus Kato traveled to Monterey, CA to coordinate activities of the research vessel, Oregon, and a local fish processor.

19-20 - Dr. William H. Lenarz and Ed Ueber attended a meeting of the Technical Subcommittee of the International Groundfish Committee of INPFC on recreational fisheries for groundfish. The meeting was held in Monterey, California.

20 - Norman Abramson attended a meeting at Tiburon which was held to explore the need for an interagency group to coordinate San Francisco Bay activities. The meeting was called by the U.S. Fish and Wildlife Service, and was also attended by representatives of the U.S. Geological Survey and the Army Corps of Engineers.

21 - Norman Abramson, Dr. Jeannette Whipple, Sus Kato, and Walburga Giguere attended the Merit Pay System Briefing for GS 13-15 managers and supervisors, in San Francisco,

CA. Chuck Patterson, of the Commerce Personnel Office, conducted the briefing.

26-28 - Ed Ueber chaired the Groundfish Plan Development Team Meeting held in Menlo Park, California, to develop responses to public and NMFS comments on the draft Groundfish Plan. Dr. Lenarz also attended the meeting.

- Mickey Eldridge attended a Marine Recreational Fisheries Symposium in Boston, Massachusetts. Papers presented at the symposium were on striped bass and provided a forum and exchange of information between researchers and managers working on striped bass throughout the United States.

27 - Dr. Edmund S. Hobson presented the past year's results of progress made in the Fish Communities/Predator-Prey Tasks at a Research Council Meeting held at the Tiburon Laboratory. Attendees at the meeting included: Norman Abramson, Dr. Jeannette Whipple, Nancy Wiley, and William Leet (Environmental Assessment Branch, Southwest Region).

PERSONNEL

Honolulu Laboratory

March 23 - William G. Gilmartin, Supervisory Wildlife Biologist - Full-time Permanent Appointment.

- Matthew S. Higashida, Biological Aid (Fisheries) - Full-time Temporary Appointment NTE 9/29/80.

31 - Laura M. Duffy, Biological Aid (Fisheries) - Resignation.

- Nathaniel T. Shippen, Biological Technican (Fisheries) - Full-time temporary appointment NTE 9/29/80.

La Jolla Laboratory

March 6 - Russell Shea, Biological Technician - Resignation.

13 - Philip Unitt, Biological Technician - Resignation.

14 - Stanley Moore, Computer Programmer - Resignation.

23 - Esther Eisenberg, Clerk-Typist - Temporary Appointment.

- Frank Gray, Biological Technician - Temporary Appointment.

Tiburon Laboratory

March 8 - Kimberly Dietrich, Clerk-Stenographer - Termination (transferred to Southwest Region).

12 - Karen Taberski, Biological Technician - 1040-hour Student Appointment.

24 - 130-Day Appointments:

- Todd Anderson, Biological Aid.

- Pat Guillemot, Biological Aid.

- Marianne McKean, Biological Aid.

- Karen Novak, Biological Aid.

- Stuart Running, Biological Aid.

- Michael Singer, Biological Aid.

- Robert Hamilton, Physical Science Aid - 700-hour Appointment.

UNITED STATES
DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
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